Title: Fine Dining In The Fourth Grade

Link to Outcomes:

- **Problem Solving** Students will apply problem-solving techniques to a real-world situation.
- **Communication** Students will be able to communicate mathematically. Students will describe and classify shapes. Students will describe varied mathematical operations used in the completion of this activity.
- **Reasoning** Students will demonstrate mathematical reasoning while solving multi-stage problems.
- **Estimation & Computation** Students will demonstrate reasonable competency in estimating and computing basic algorithms in addition, subtraction, multiplication, division, fractions, money, and geometry.
- **Connections** Students will be able to demonstrate connections between mathematics and other disciplines.
- **Technology** Students will use technology where appropriate.
- **Geometry & Spatial Sense** Students will apply geometric relationships using two and three-dimensional objects.
- **Measurement** Students will apply the concepts of measurement using standard units. Students will apply measurement to real-world problem-solving activities.
- **Mathematical Disposition** Students will demonstrate a positive attitude toward math and will value and appreciate the role of mathematics in the real-world setting.

Brief Overview:

Students will create a classroom restaurant serving 24 students a meal, which will include an appetizer, main course, dessert, and beverage. Geometry skills will be used to plan and build the restaurant within the classroom. Common fraction skills will be demonstrated by planning and preparing a meal to "sell" to classmates. Decimal fraction skills will be used to establish cost and profit for the production of the meal.

Grade/Level:

Fourth or Fifth Grade

Duration/Length:

This activity should take 10 days, with students working approximately 1-2 hours per day.

Prerequisite Knowledge:

Common Fractions:	recognize proper/improper fractions; add, subtract, and multiply common fractions; use equivalent fractions.
Decimal Fractions:	use money and make change.
Estimation & Computation	estimate and compute solutions to multitask problems.
Technology	use technology (calculators, computers, etc.) where appropriate.
Geometry & Spatial Sense	calculate area and perimeter; identify shapes; create scale floor plan.
Measurement	use measure in planning and constructing restaurant.

Objectives:

The students will:

- plan and draw a model of their restaurant.
- calculate area and perimeter of the restaurant and furniture.
- use spatial ability to design functional restaurant layout.
- add or multiply fractions to increase recipe yield.
- estimate and calculate cost to purchase ingredients.
- estimate and calculate profit margin.
- use calculators as a computational tool.
- participate in realistic restaurant experience.

Materials/Resources/Printed Materials:

Materials per group of four

- Activity packet
- Calculators
- Rulers / yardsticks
- Cooking utensils
- Place settings for all
- Construction paper
- Ingredients for recipes

Development/Procedures:

Day 1: Physical Planning

(See Attachment #1) The teacher will review the concepts of area, perimeter, and shapes through a math warm-up game.

The class will then do an activity in which they make objects using *Unifix*™ cubes. The students will demonstrate how to find the area and the perimeter of the object. They will make several objects.

Teacher will explain the project. Working in cooperative groups of four, students will create a restaurant from physical design, menu planning, food preparation, and serving. The menu must include an appetizer, an entree, a dessert, and a beverage.

The students will then work on the restaurant's physical design. They will plan to use the class as their restaurant in the final activity. In the designs, the students will plan for waiting, seating, cooking, and serving areas within the restaurant. Calculation of area and perimeter will be necessary, so that their floor plan is accurate and feasible. Students will create accurate scale diagrams of their floor plans to facilitate assembly of the restaurant on the given day.

The students will keep a record of the planning process in their Math journals.

Homework Assignment: The students will bring in recipes from home for possible inclusion on the menu.

Day 2: Menu Preparation

(See Attachment #2) The teacher will review the concepts of adding, subtracting, and multiplying common, mixed, and improper fractions through a math warm-up game.

The teacher will then show the class a recipe and discuss possible ways to increase the yield of the recipe to feed the entire class. As a whole class lesson, students will convert several recipes using the fraction concepts reviewed during the warm up.

Restaurant groups will then meet to decide on menu items and to calculate quantities of ingredients which will be needed to feed the entire class. A shopping list will be generated and presented to the teacher for review.

The students will keep a record of the planning process in their Math journals.

Homework Assignment: Students will research the cost of the ingredients. Bring in grocery receipts, categorized by food group.

Day 3: Ingredient Cost Analysis

(See Attachment #3) The teacher will review the concepts of adding and subtracting money through a math warm-up game.

The students will then calculate the cost to prepare each item on the menu. Students will calculate the total cost of their menu items.

The students will keep a record of the planning process in their Math journals.

Homework Assignment: Students will begin creating decorations for the restaurant.

Day 4: Guest Speaker/Profits

Invite a local restaurant manager/owner to speak to the students about how prices are set in the restaurant. Quite possibly a parent from your class will be in this position.

The teacher will give a short mini-lesson on setting prices and estimating profits. The students will all be given play money and will be given a mini lesson on percentage by reviewing tipping procedures.

The students will then calculate the prices they will charge for their menu items. The groups will cooperatively design and create their menus.

The students will keep a record of the planning process in their Math journals.

Teacher will randomly select order of presentations for the next six days. Teacher or parent volunteer can shop for supplies. Money can be obtained from PTA, school materials fund, or student contributions.

Homework Assignment: Write thank you note to guest speaker. Final Preparations.

Days 5 - 10: Grand Openings

(See Attachment #5) Group 1 (2 through 6 consecutively) will set up its restaurant according to its design. Group members can assign tasks such as cook, server, host, cashier, etc. While food preparation is taking place, others can direct class in the physical set up of classroom. (If additional time is needed for food preparation, the meal may be scheduled for the afternoon, with food preparation taking place through recess. Additionally, parent volunteers could be a tremendous benefit.) One group per day for 6 days runs its restaurant. The students will decide who will be the host/hostess, waiter/waitress, cook, and cashier.

The students will participate in the restaurant enactment. The cashier will tabulate the bills and present them to the diners. The diners are expected to check the bill, calculate tip, and pay the bill. The cashier is expected to make change.

The students will keep a record of the days' activities in their Math journals.

Homework Assignment: Diners will write a restaurant review.

Evaluation:

Teacher will evaluate students using a scoring rubric (see Attachment R):

- Student Math journals
- Activity sheets
- Restaurant design and menu
- Teacher observation
- Group cooperation

Extension/Follow Up:

Create an advertisement for the restaurant. This may include making advertisements for display, newspaper, and/or radio/TV.

Create an electronic archival record (portfolio) of the restaurant project using programs such as *HyperStudio*© or *Hypercard*©. The work could be digitally stored using a scanner or digital camera. The commercials may be imported using different software programs.

Research projects: Students may conduct further investigations into the restaurant field. Examples could include: 1) calculating the additional cost of other menu items, utilities, wages, etc., as a true restaurateur would; 2) visiting and interviewing a restaurant owner about the operation of his/her business; 3) investigating career opportunities.

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Name: _____ Date: _____

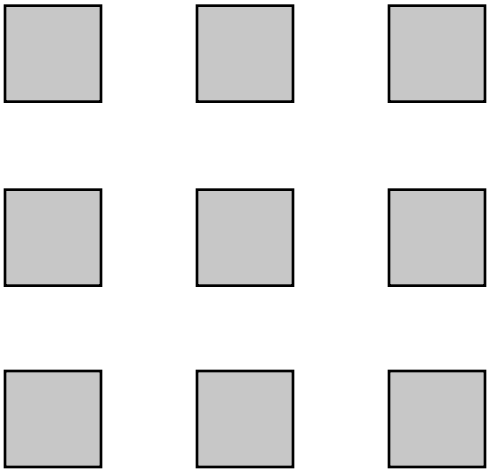
Restaurant Design

Directions: Your group will be constructing a floor plan for a restaurant. Your group will need to seat 24 people in your restaurant. Your group may use any combination of tables, as long as there are exactly 24 seats. Your group will also need a kitchen, a service counter, a waiting area, and a place where your customers will pay. The design will be graded for originality and correctness. Do your best. I know your group can!

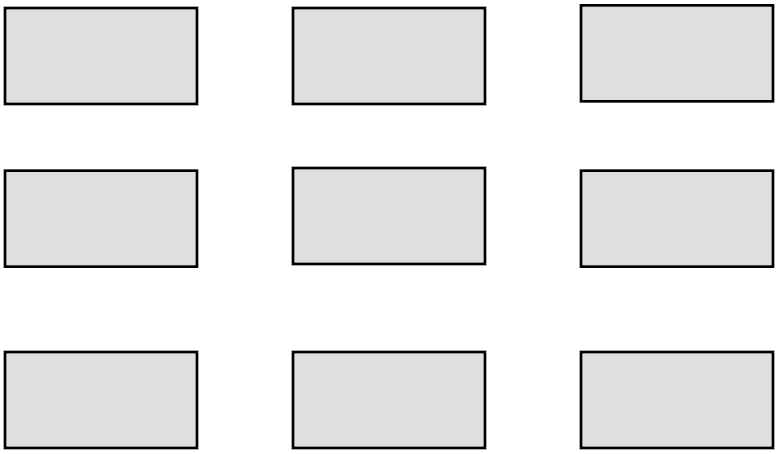
Hints:

1. There needs to be 2 feet between tables to allow access.
2. The service area and kitchen need to be 24 square feet.
3. The perimeter of the waiting area needs to be 16 feet.

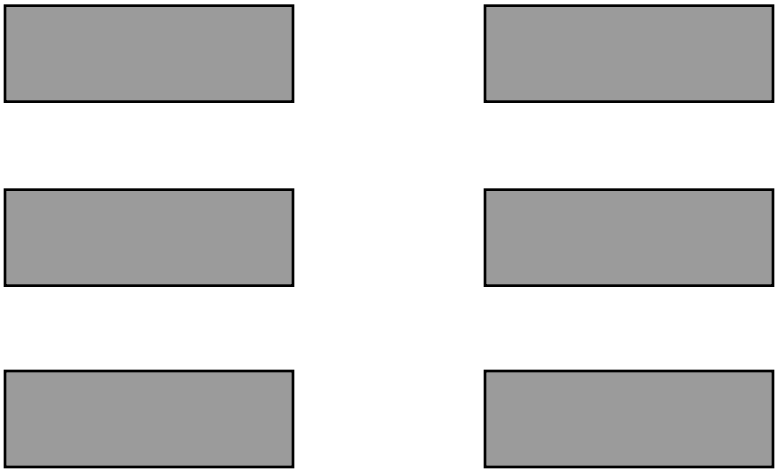
SCALE: 1/2 inch = 1 foot



Each square table seats 2 people.



Each rectanglular table seats
4 people.



Each large rectangular
table seats 6 people.

Name: _____ Date: _____

Restaurant Design

Group Roles:

1. The leader: The leader's job is to make sure that everything runs smoothly. If there is a disagreement, then the leader solves the problem. The leader also is responsible for writing down the problems and answers to the area and perimeter problems.

2. & 3. The Constructionists: There are two of these. Constructionist 1 makes the outline of the restaurant and makes the table layout. Constructionist 2 makes the kitchen/service area, the waiting room, and any other part to the restaurant.

4. The Reporter: The reporter reports to the teacher about the group's restaurant design.

Directions:

1. Draw the outline of the room.
2. Put your tables onto the grid.
3. Make your service and kitchen area.
4. Make your waiting area.
5. Add any other part to the restaurant that you feel is needed.
6. Find the perimeter and area - a work area is provided.
7. Check with the teacher.

Name: _____ Date: _____

Restaurant Design

1. What is the area of the restaurant? Write the problem, the answer, and brief explanation of how you came to the answer.

2. What is the perimeter of the restaurant? Write the problem, the answer, and a brief explanation of how you came to the answer.

3. When all work is finished, conference with the teacher.
Conference Notes:

_____

_____

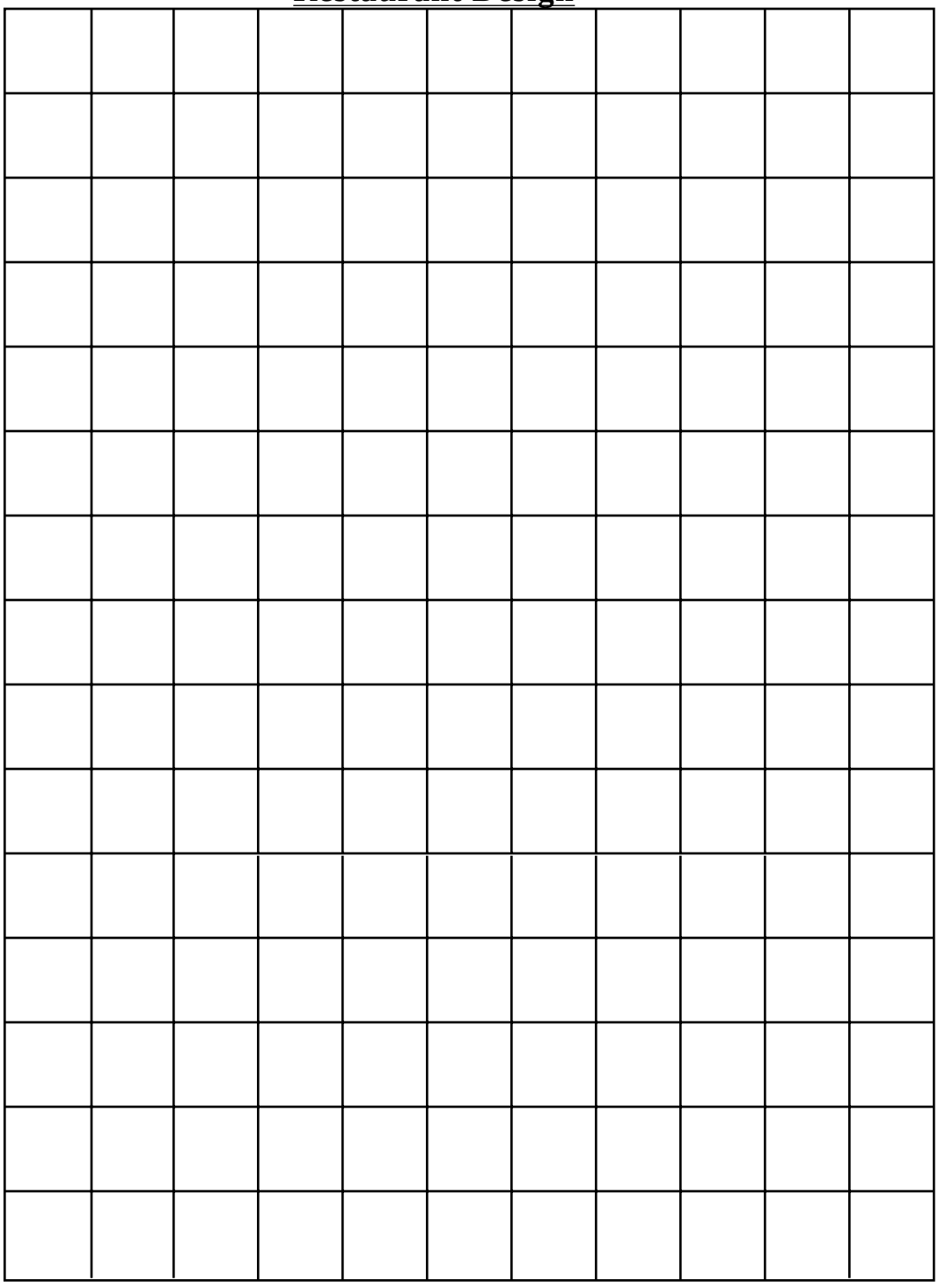
_____

_____

_____

Name: _____ Date: _____

Restaurant Design



Name: _____ Date: _____

Will There Be Enough?

Directions: Below are the ingredients needed to make a delicious pizza. Unfortunately, this recipe only makes enough pizza for 6 people. We need to E-X-P-A-N-D this recipe to feed the entire class. Use you knowledge of fractions to help you.

Mama's Yummy Pizza
(6 servings)

2 cups flour
1/2 package yeast
1/3 teaspoon sugar
3/4 cup luke warm water
2/3 cup water
1 1/4 cups tomato sauce
2 cups mozzarella cheese
8 ounces pepperoni
2 green peppers
10 mushrooms
12 anchovies

Use the table to calculate what you will need to make enough pizza for the entire class. The first item is done for you.

Number of students in class: _____ Recipes needed: _____

Ingredient:	Amount for 1 recipe:	x	Recipes needed:	=	Total:
Flour :	2 cups	x	4	=	8 cups
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____

Name: _____ Date: _____

How Much Will We Need?

Directions: You now know how to calculate the amount of ingredients you will need to feed a large group. First, make your ingredient list for each menu item. Then use the table to help calculate the quantities you will need to make enough for the whole group.

Appetizer Ingredients

Ingredient:	Amount:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

This recipe will feed _____ people.

Number of students in class: _____ Recipes needed: _____

Ingredient:	Amount for 1 recipe:	x	Recipes needed:	=	Total:
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____

Name: _____ Date: _____

How Much Will We Need?

Directions: You now know how to calculate the amount of ingredients you will need to feed a large group. First, make your ingredient list for each menu item. Then use the table to help calculate the quantities you will need to make enough for the whole group.

Entree Ingredients

Ingredient:	Amount:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

This recipe will feed _____ people.

Number of students in class: _____ Recipes needed: _____

Ingredient:	Amount for 1 recipe:	x	Recipes needed:	=	Total:
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____

Name: _____ Date: _____

How Much Will We Need?

Directions: You now know how to calculate the amount of ingredients you will need to feed a large group. First, make your ingredient list for each menu item. Then use the table to help calculate the quantities you will need to make enough for the whole group.

Dessert Ingredients

Ingredient:	Amount:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

This recipe will feed _____ people.

Number of students in class: _____ Recipes needed: _____

Ingredient:	Amount for 1 recipe:	x	Recipes needed:	=	Total:
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____

Name: _____ Date: _____

How Much Will We Need?

Directions: You now know how to calculate the amount of ingredients you will need to feed a large group. First, make your ingredient list for each menu item. Then use the table to help calculate the quantities you will need to make enough for the whole group.

Beverage Ingredients

Ingredient:	Amount:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

This recipe will feed _____ people.

Number of students in class: _____ Recipes needed: _____

Ingredient:	Amount for 1 recipe:	x	Recipes needed:	=	Total:
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____
_____:	_____	x	_____	=	_____

How Much Will It Cost?

Directions: It is now time to calculate the cost to prepare each item on your menu and the total cost of your menu. Use the information collected the other day and your own research to determine how much it will cost to prepare the items on your menu. Use the table to calculate the cost for each recipe and then the total for the whole meal.

Appetizer

Ingredient:		**Amount:**
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
	Total (A):	**+** _____

Entree

Ingredient:		**Amount:**
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
_____		**$** _____
	Total (B):	**+** _____

Dessert

Ingredient:		Amount:
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
	Total (C):	+ _____

Beverage

Ingredient:		Amount:
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
_____		$ _____
	Total (D):	+ _____

Total Cost:

Total A: $ _____
Total B: $ _____
Total C: $ _____
Total D: + $ _____

_____

Total Cost for Menu: $ _____

Name: _____ Date: _____

Cost-Profit Activity Sheet: Appetizer

Directions: In this activity, you will calculate the cost to feed each individual. You will calculate the amount of profit that you would like to make from each appetizer. Use the information provided by our guest speaker.

1. Write down the different ingredients in your appetizer recipe and the cost for each ingredient.

Items:	**Cost:**
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	+ _____
	$ _____

2. Add the cost of each item for your total cost.

Total Cost: $_____

3. Now find the cost per individual. You will need to divide the total cost by the number of students in the class. You may use a calculator to do this.

Total cost $_____ ÷ _____ = _____

Cost per Individual

4. **Profit:** In the space below, you will now calculate the amount you will charge for each appetizer. You will then write an explanation of how you came to your answer.

Cost Per Appetizer: $_____

Explanation:

_____

_____

_____

_____

_____

5. Now that you know the cost of your appetizer, estimate what it would cost for 24 people to eat that item. Show work below, and write an explanation of your estimating process.

Name: _____ Date: _____

Cost-Profit Activity Sheet: Entree

Directions: In this activity, you will calculate the cost to feed each individual. You will calculate the amount of profit that you would like to make from each entree. Use the information provided by our guest speaker.

1. Write down the different ingredients in your entree recipe and the cost for each ingredient.

Items:	Cost:
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	+ _____
	$ _____

2. Add the cost of each item for your total cost.

Total Cost: $_____

3. Now find the cost per individual. You will need to divide the total cost by the number of students in the class. You may use a calculator to do this.

Total cost _____ ÷ _____ = _____

Cost per Individual

4. **Profit:** In the space below, you will now calculate the amount you will charge for each entree. You will then write an explanation of how you came to your answer.

Cost Per Entree: $_____

Explanation:

_____
_____
_____
_____
_____

5. Now that you know the cost of your entree, estimate what it would cost for 24 people to eat that item. Show work below, and write an explanation of your estimating process.

Name: _____ Date: _____

Cost-Profit Activity Sheet: Dessert

Directions: In this activity, you will calculate the cost to feed each individual. You will calculate the amount of profit that you would like to make from each dessert. Use the information provided by our guest speaker.

1. Write down the different ingredients in your dessert recipe and the cost for each ingredient.

Items:	Cost:
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	+ _____
	$ _____

2. Add the cost of each item for your total cost.

Total Cost: $_____

3. Now find the cost per individual. You will need to divide the total cost by the number of students in the class. You may use a calculator to do this.

Total cost: $ _____ ÷ _____ = _____

Cost per Individual

4. **Profit:** In the space below, you will now calculate the amount you will charge for each dessert. You will then write an explanation of how you came to your answer.

Cost Per Dessert:$_____

Explanation:

_____

_____

_____

_____

_____

5. Now that you know the cost of your dessert, estimate what it would cost for 24 people to eat that item. Show work below, and write an explanation of your estimating process.

Name: _____ Date: _____

Cost-Profit Activity Sheet: Beverage

Directions: In this activity, you will calculate the cost to feed each individual. You will calculate the amount of profit that you would like to make from each beverage. Use the information provided by our guest speaker.

1. Write down the different ingredients in your recipe and the cost for each ingredient.

Items:	Cost:
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	+ _____
	$ _____

2. Add the cost of each item for your total cost.

Total Cost: $_____

3. Now find the cost per individual. You will need to divide the total cost by the number of students in the class. You may use a calculator to do this.

Total cost: $ _____ ÷ _____ = _____

Cost per Individual

4. Profit: In the space below, you will now calculate the amount you will charge for each beverage. You will then write an explanation of how you came to your answer.

Cost Per Beverage: $_____

Explanation:

_____
_____
_____
_____
_____

5. Now that you know the cost of your beverage, estimate what it would cost for 24 people to eat that item. Show work below, and write an explanation of your estimating process.

Name: _____ Date: _____

How Much Do I Owe?

Directions: Once you have finished your meal, you will need to pay for it. The waiter will total your bill for you. You should double check the total and then add your tip. Usually, a tip is 15% of the total bill. However, if you were very impressed by your meal and the quality of your service, you may want to leave a larger tip.

_____
(Restaurant Name)

Your Bill

Appetizer: _____ Cost: $ _____

Entree: _____ Cost: $ _____

Dessert: _____ Cost: $ _____

Beverage: _____ Cost: $ _____

\+ _____

Subtotal: $ _____

Tip: $ _____

Total: $ _____

Work Area:

Name: _____ Date: _____

Restaurant Review

Directions: You are the food critic for *The Washington Post* newspaper. You have just had a meal at a local restaurant and are now required to write a newspaper column about the restaurant. In your column, you will need to critique the food, the prices, the atmosphere, and the service. You should comment on what you liked as well as disliked. Be critical, but don't look for fault. Remember to write to your audience. Good Luck!

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Group Name:_____ Date:_____

Scoring Rubric-Part 1

Each day the group as a whole will get a grade.

Four Points:
√ when complete:

_____ Each person does his/her job.
_____ The group has completed task.
_____ The correct behavior is displayed.
_____ Work is grammatically and mathematically correct.
_____ Work is very neat.
_____ All group members will be able to report completely on results of daily task.

Three Points:
√ when complete:

_____ Each person does his/her job with little redirection.
_____ The group has completed task.
_____ The correct behavior is displayed.
_____ Work has 2 or less errors.
_____ Work is neat.
_____ All group members will be able to report on the daily results with little prompting.

Two Points:
√ when complete:

_____ Each person does his/her job with redirection.
_____ The group does not get done, but is progressing.
_____ Good behavior is displayed.
_____ Work has 4 or less errors.
_____ Work is legible.
_____ Three group members will be able to report on the daily results with little prompting.

One Point:
√ when complete:

_____ The group is frequently off task.
_____ Assignment is not completed.
_____ There are some minor behavior problems.
_____ Work has 6 or less errors.
_____ Work is sloppy.
_____ Two or fewer group members will be able to report on the daily results with little prompting.

Scoring Rubric-Part 2

We gave ourselves _____ points.
We feel we deserve this score because

_____
_____
_____
_____
_____
_____
_____
_____

The teacher gave us _____ points.
He gave us this score because

_____
_____
_____
_____
_____
_____

What can we do to improve our group tomorrow?

_____
_____
_____
_____
_____
_____